

allied. At the same time it is important to notice that it does present certain points of resemblance to *Strix*. These are not, however, in my opinion, sufficiently numerous or important to lead to the conclusion that *Photodilus* occupies a really intermediate position between the two families. The structure of *Photodilus* does not necessitate either the creation of a separate family for its reception, or the amalgamation of the two generally recognized families into one.

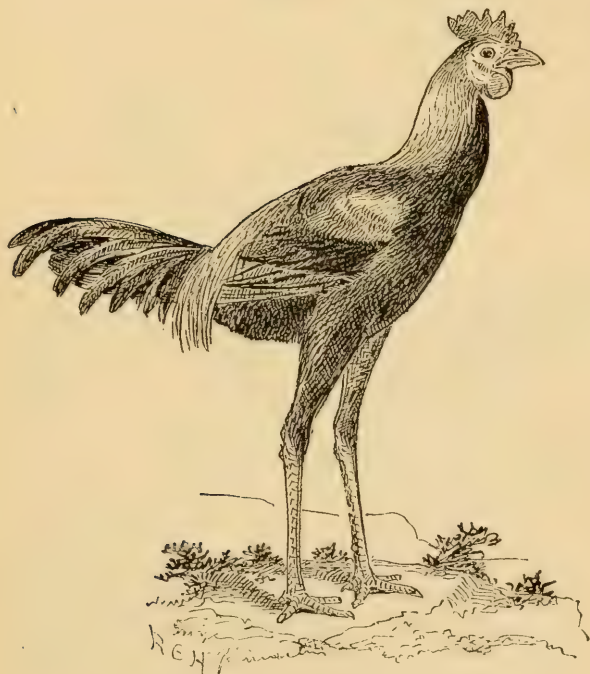
XXVII.—*On the Principal Modern Breeds of the Domestic Fowl.* By W. B. TEGETMEIER, F.Z.S., M.B.O.U.

ON the occasion of an exhibition of the various breeds of poultry in the grounds of the Zoological Society of London in September last, the Editor of 'The Ibis' did me the honour to suggest that an illustrated article on the subject of the modern varieties might be interesting to ornithologists, and requested me to undertake its production. I had much pleasure in acceding to his request. For many years I have been interested in the subject, not only from an anatomical, but also from a practical standpoint. My first introduction to Darwin was by Yarrell, thirty-five years ago, on which occasion the author of the 'Origin of Species,' which was not then published, came to my house to inspect a large collection of crania and other preparations illustrating the extent of variation in the domesticated *Gallus ferrugineus*. Engravings of several of these, and some figures of the heads of fowls of distinct breeds, were given in Darwin's 'Variation of Animals and Plants,' and it will be interesting to trace the extension of variation in the several breeds since the publication of that work in 1868 to the present time.

The breed which most closely resembles the wild *Gallus ferrugineus*, from which Darwin thought all the domestic varieties had descended, is (or, perhaps it would be more correct to say, was) the ordinary Game breed, one sub-variety of which, known as the Black-breasted Red Game, from the arrangement of colours in the male, differs from the wild original chiefly in being of larger size and in the more

erect bearing of the tail. During the period that Game cocks were bred for the cock-pit, the conformation of the wild bird was but slightly departed from; but since the establishment of competitive poultry shows, the breeders have aimed at increasing the length of the neck and limbs, the result being the production of such specimens as are shown in figures 1 and 2, representing a Black-breasted

Fig. 1.

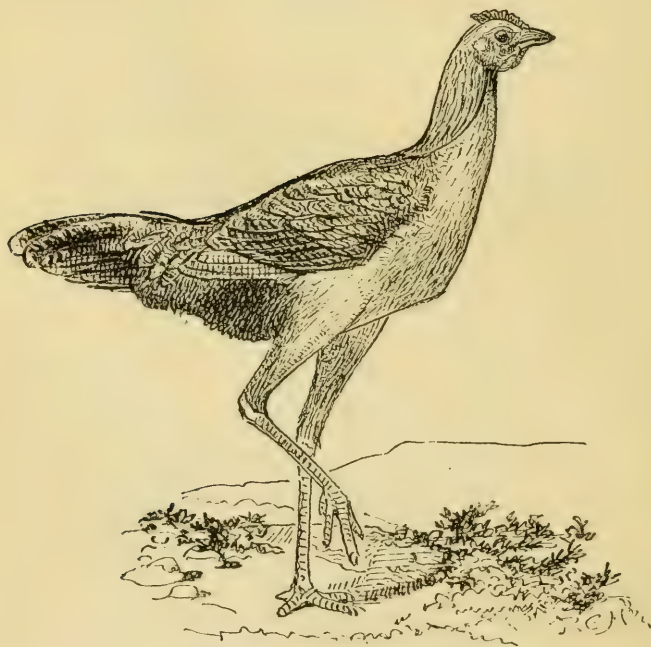


Black-breasted Red Game Cockerel.

Red Game cockerel and pullet that have just assumed their adult plumage, having been drawn, as were all the illustrations to this article, in September from birds of the current year. So successful have been the efforts of the fanciers to produce long-limbed birds, that the hens not unfrequently stand with the keel of the breast-bone raised 12 or 13 inches from the ground. The feathers in this breed are now required

to be firm, narrow, and closely pressed to the body, the long flowing sickle tail-feathers of the male, that were formerly admired, being reduced to scanty proportions. That so complete a change should be effected in a few years is a striking example of the power of the breeder to alter the type of a breed by careful selection of brood-stock,—the object being to produce breeds that should excel others in the conventional fancy points, so as to be able to win prizes at competitive shows, the sale-value of such birds for the purpose of

Fig. 2.



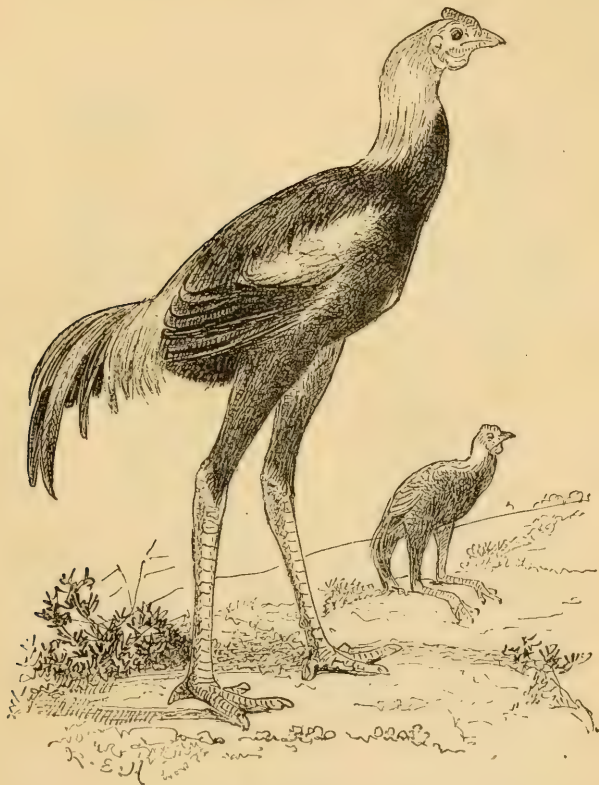
Black-breasted Red Game Pullet.

exhibition rising higher in some instances than £50 each. It is hardly necessary to remark that such birds as these represented would be of no value in the cock-pit, as they would at once be overpowered by birds of greater strength of limb.

The Malay breed, a young male of which in full plumage is shown in figure 3, is one of much greater size than the

Game; the legs, though greatly elongated, are thick and massive, and the body more weighty than it appears, as the plumage is excessively close and firm, and so scanty that in the older birds the naked skin often appears on the breast, neck, and legs, turning bright red by exposure to the light

Fig. 3.



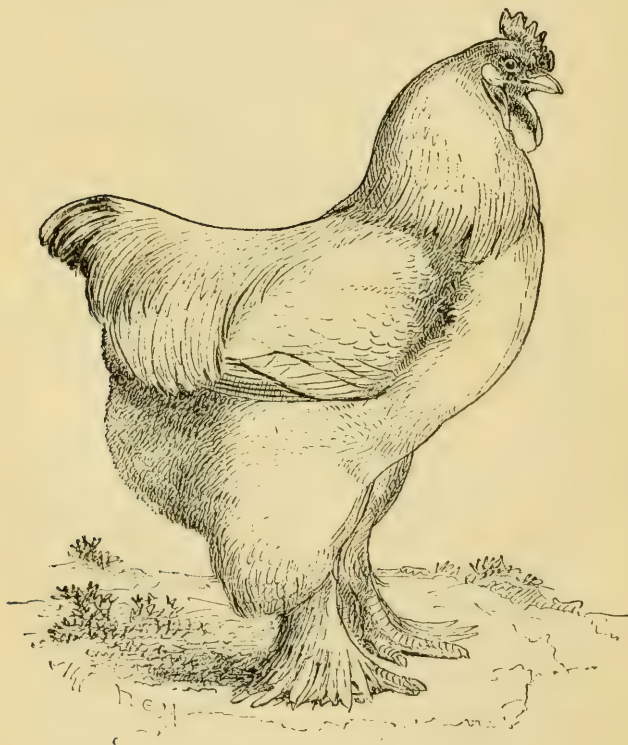
Malay Cockerel.

and air. From the length of the legs and the necessity of resting them, the males not unfrequently assume the attitude shown in the smaller figure, which has a ludicrous resemblance to that of a kangaroo. The comb in the Malay is closely adpressed to the skull, and quite destitute of the ser-

rations which characterize that of the wild *G. ferrugineus* and the Game breed.

The Malay is one of the very few fowls of which the geographical title is correct. Typical specimens are frequently brought from the Malay peninsula. Temminck figured the variety, which he erroneously regarded as a distinct species,

Fig. 4.



Buff Cochon Cockerel.

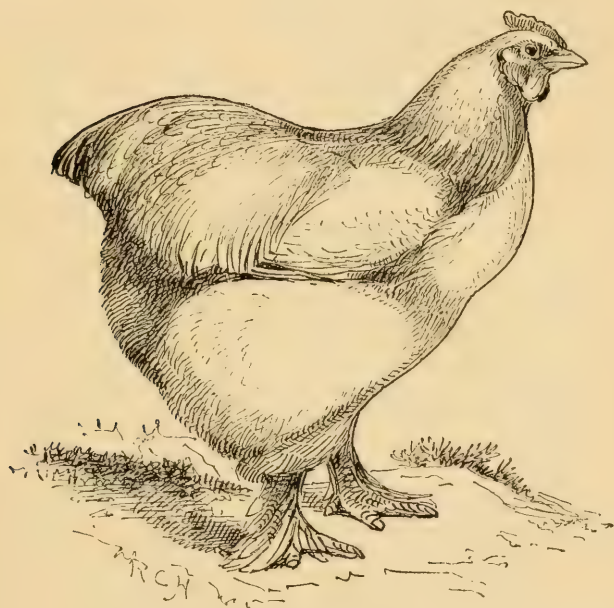
under the name *Gallus giganteus*, and in the early period of the Zoological Society specimens imported by Colonel Sykes were shown as "Kulm Fowls."

The Malay has not greatly altered since Darwin's time, as the object of the breeders of this variety was always to secure

great length of limb and neck and hardness of plumage, conjoined with size and weight.

It has been supposed that the elongation of the modern show Game has been obtained by crossing with the Malay; but there is no evidence to prove this, and, from a fancier's point of view, more would be lost by introducing the coarseness of limb and head than would be gained, as much time would be required to "breed out" these characters.

Fig. 5.



Buff Cochin Hen.

A variety of the Malayan type, with shorter legs and excessively glossy plumage, has been for many years bred largely in the south-western counties, particularly Devon and Cornwall, being known as the Indian Game. It is an exceedingly weighty bird, having very large pectoral muscles, and is admirably adapted for improving our domestic poultry by crossing. It has, unfortunately for its utility, been recently largely exhibited, and will probably be bred for

feathers of a particular marking rather than for its useful table properties. This breed, being very local at the time that Darwin wrote, was not described by him.

Following the arrangement adopted by Darwin in his work on 'Variation,' I now arrive at the Cochins, a geographical misnomer, as these birds at the time of their introduction were as unknown in Cochin China as in England, and came from Shanghai, a port many hundreds of miles to the north. Cochins (figs. 4 & 5, pp. 308, 309) are distinguished by their great size and the abundance of fluffy plumage on the body, the wing and tail-feathers being extremely short, so that typical birds are quite incapable of flight. In the original importations the legs (tarsi) were generally feathered. This has been regarded as an important point by fanciers, and much care has been bestowed on the production of feathers on the legs and feet, so that in first-rate show-specimens the foot-feathers are strong quills, often 6 or 8 inches in length.

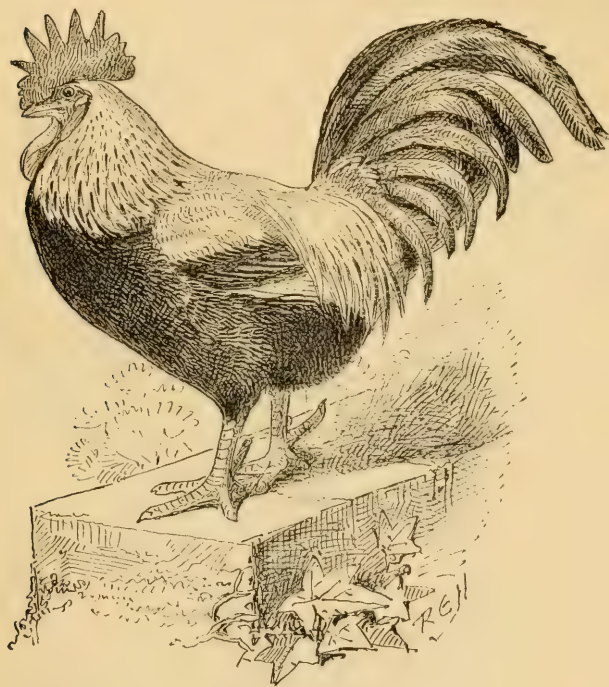
On their first introduction they were abundant layers of buff-coloured eggs, small in size when compared with that of the bird. Exhibition specimens have been bred so exclusively for show purposes, no attention having been paid to breeding for egg-production, that they have lost this characteristic, and are now generally very indifferent layers. Cochins offer several points of difference from the older known breeds. The long axis of the occipital foramen is vertical, in place of being horizontal. The forehead has a deep frontal groove. Their habits and nesting, when allowed to range, vary from those of other fowls, and their voice is remarkably distinct. These characteristics, into the consideration of which I cannot enter fully in this paper, lead me to believe that the Cochin had its origin in a species of *Gallus* which has, like the camel, wholly passed into a state of domestication.

The introduction of the Cochin into England some forty years ago gave the first impulse to the exhibition of fancy poultry and to the manufacture of new breeds by crossing different varieties. Thus, the Brahmas did not, as alleged, come from the river from whence they take their name, where fowls of the character are quite unknown, but were

produced in America by crossing Cochins with a large grey variety of Malays called Chittagong. At first many of the chickens were black, but by careful selection the colour and markings were fixed in a few generations; and as they now produce their own like they are regarded as a pure breed.

More recently a new variety, which now breeds fairly true

Fig. 6.



Dorking Cockerel.

to colour, though still producing some black chickens, has been formed in America by crossing the Cochin with the Dominique, a Cuckoo-marked farm-yard fowl common in the United States. This new breed, known as the Plymouth Rock, is now very common in England, and is valuable as a prolific layer, but, like all breeds derived from the Cochin, is deficient in the size of the pectoral muscles and possesses a yellow skin.

The Langshan is a recently introduced Asiatic breed, which at first closely resembled the black Cochin, but by careful selection has been rendered much closer in plumage, more resplendent in colour, and its quality as a table-bird improved.

The Dorking of the present day (fig. 6, p. 311) is a large, heavy, massive bird, which was greatly increased in size some

Fig. 7.

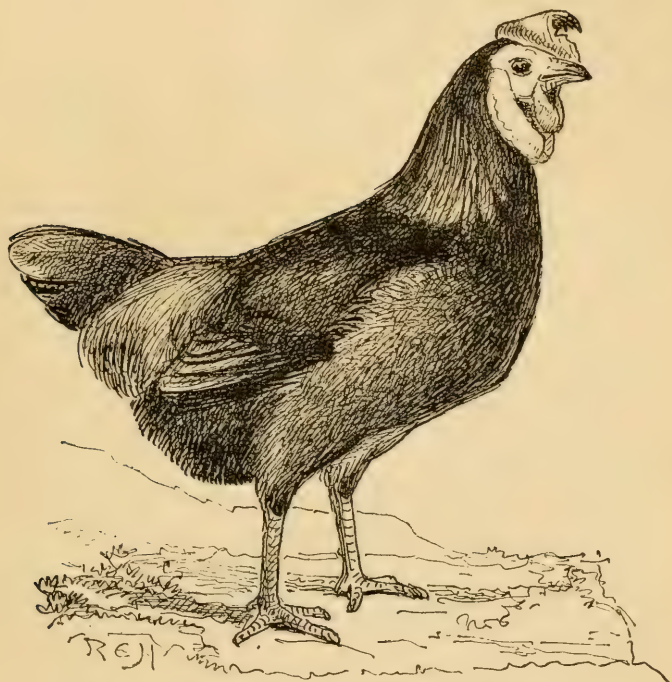


Spanish Cockerel.

quarter of a century since by being crossed with a large Malay or Kulm cock, introduced by Col. Sykes. It still retains the fifth toe, an unnatural excrescence, which renders these heavy birds very liable to diseased feet. As a remarkable illustration of the effect of competition, I may state that one of the successful rearers of these birds some forty years since was in the habit of cutting away the supernu-

merary toe to prevent lameness in his fowls; whereas, later on, the most successful exhibitor of the breed used to look over his chickens as they were hatched and at once destroy any that had not five toes on each foot. This remorseless process of selection eventuated in his strain being invariably five-toed. Dorkings are of various colours, the white not being as large as the darker varieties. The Surrey and Sussex fowls, which constitute the bulk of the best birds sent to the London markets, are largely crossed with the Dorking breed.

Fig. 8.



Spanish Hen.

The Mediterranean breeds, as they are reared in this and other countries where poultry shows are prevalent, have certain well-marked characteristics in common, namely, large, thin, single, compressed combs, deeply serrated; these, in show birds, must be erect in the cocks (fig. 7, p. 312) and

folded on the top of the head in the hens (fig. 8, p. 313). The ear-lobe or lappet in all is white, as in the Indian specimens of *G. ferrugineus*, and in the breed known as Spanish (figs. 7 & 8) this whiteness extends over the whole face. At the earlier poultry shows Spanish were rarely, if ever, seen without a small proportion of red over the eyes, but at the present time such birds would have no chance of winning prizes at a competitive show. The size of the ear-lobe, about half an inch square in the wild original, has been increased to seven inches in depth by four or more in width, and in many old birds its growth would quite obscure the eyeball and interfere with vision unless cut away.

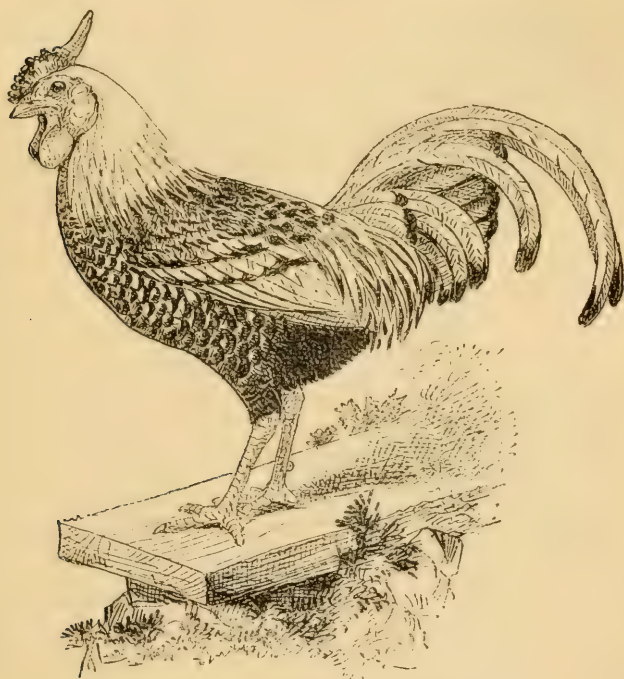
The colour of the plumage in Spanish is black in both sexes, although purely white chicks are occasionally produced, and sometimes a black bird will more or less completely assume white feathers at the autumnal moult. The chickens, when just hatched, are clothed in black and white down, whereas buff Cochin chickens are entirely buff, and the various breeds approaching the colours of the *G. ferrugineus* have three characteristic broad stripes of dark brown down the back, which are in strong contrast to the lighter ground on which they are placed.

In all the Mediterranean breeds, which may be taken to include the varieties known as Spanish, Minorcas, Leghorns, Andalusians, &c., the hens are non-sitters. The birds have been selected for prolificacy, and the instinct for incubation so rarely encouraged that it has at last ceased to prevail, and not one hen out of fifty becomes "broody" or manifests any desire to hatch her eggs. Before the advent of poultry shows Spanish fowls were valued as prolific layers of large white eggs, and those from the most prolific layers were selected for the production of chickens. For the purpose of exhibition, however, the birds have been selected for fancy points, and prolificacy altogether ignored, the result being that the variety is nearly useless for practical purposes, and has gone out of general favour, except as a purely fancy fowl.

Minorcas, a breed that has for many years been largely bred in the south-western counties of England, differ from

Spanish in having red faces, the white ear-lobe and wattles being much less developed. They possess the prolificacy that the Spanish have lost, and are most abundant layers of large white-shelled eggs. They have, unfortunately for their utility, lately come into fashion as exhibition fowls, the object of the breeders being to develop the comb in the cocks to the largest possible size that it is capable of assuming whilst maintaining a plane surface and erect position.

Fig. 9.



Silver-spangled Hamburg Cockerel.

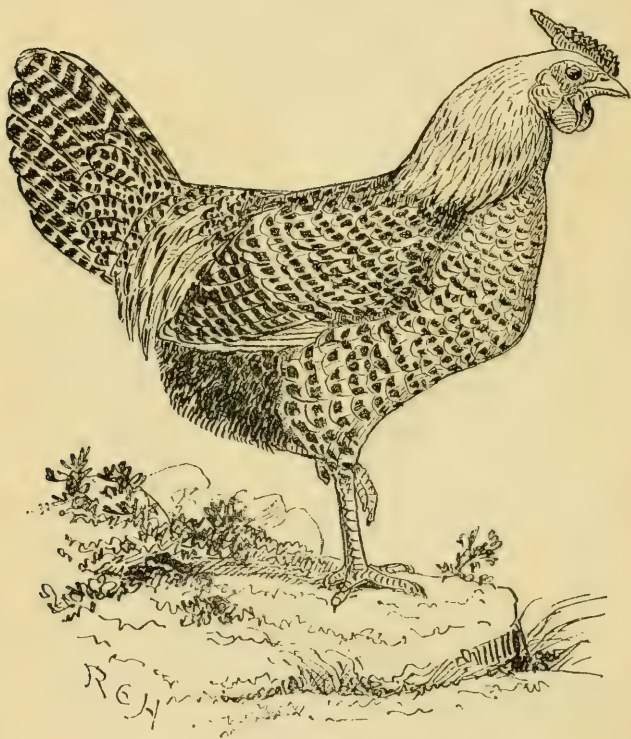
Andalusians are another sub-variety of the Spanish or Mediterranean type. In this breed the colour is slaty blue, but the hens recently exhibited are characterized by a dark margin or edging to breast- and body-feathers.

Leghorns are of the same general type, but with white plumage and yellow legs (tarsi). Since their introduction into

this country from the United States, where the breed was first carefully bred, they have been crossed with ordinary Game, and brown, as distinguished from white, Leghorns are an established breed.

Under the name of Hamburgs, a misnomer which was first employed at one of the early Birmingham shows, several

Fig. 10.

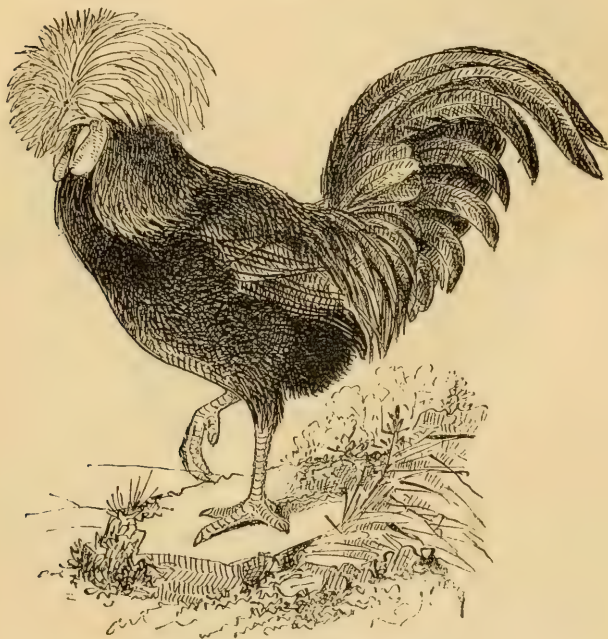


Pencil Hamburg.

distinct breeds of fowls are confounded together. The so-called Spangled Hamburgs (fig. 9, p. 315) originated apparently in England; small competitive shows, which were confined to the hens, having existed in the north for a long period. In this breed, of which there are two sub-varieties, named, according to the ground-colours, Gold- or Silver-spangled, the

feathers are tipped with a black mark, crescentic in some strains and circular in others. The birds were formerly called Mooneys or Pheasant-fowls. The combs are what are known as double, being flat on the head, peaked behind, and covered with small short sprigs. These breeds are of fair size and are non-sitters. A sub-variety with the plumage entirely black is known as the Black Hamburg.

Fig. 11.



White-crested Black Polish Cock.

Pencilled Hamburgs (fig. 10, p. 316) are unquestionably of continental origin; they are well known in France as Campines, and on their first introduction to this country were termed Dutch every-day layers. They are smaller than the spangled breeds, and are characterized by the feathers of the hens (and those of both sexes before the moult into adult plumage) being marked with several transverse bars of black on a white or bay ground.

The fowls known in this country as Polish and in France as *Race de Padoue* (fig. 11, p. 317) are characterized by large feathered crests, which appear to necessitate a peculiar development of the frontal bones for their support. This protuberance, which assumes a hemispherical form, is seldom completely ossified; it contains the anterior part of the

Fig. 12.



Spangled Polish Hen.

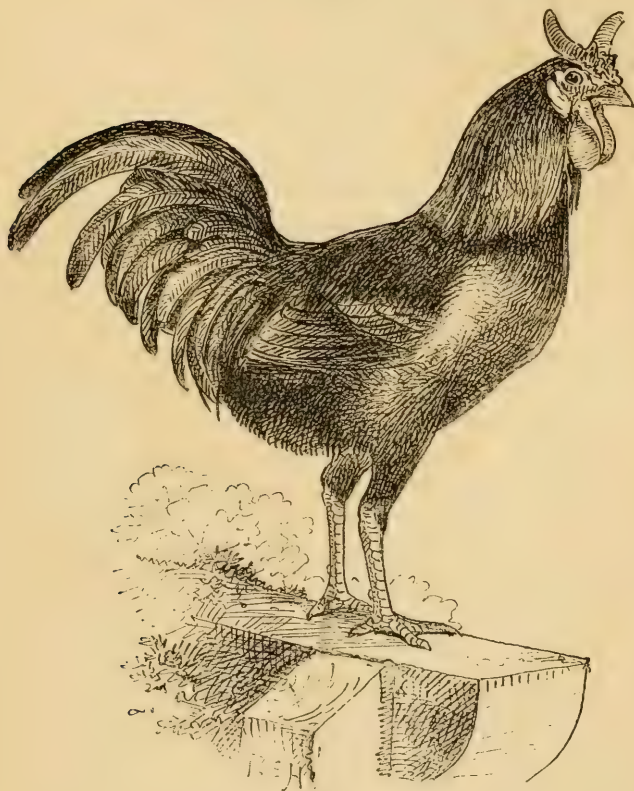
brain, which consequently is in a most abnormal form, approaching that of an hour-glass*.

The Polish breeds are of considerable antiquity, having been described by Aldrovandus and figured by the old Dutch painters. Beyond increasing the size of the crests and the

* Cf. Tegetmeier on "Skulls of Polish Fowls," P. Z. S. 1856, p. 366.

regularity of the markings but little alteration has been since effected in these breeds. Figure 11 (p. 317) represents a cock of the white-crested black variety, in which the ordinary wattles are present in full size. In despite of the most persistent efforts of the breeders, the white crests of the birds

Fig. 13.



La Flèche Cockerel.

of this breed always show some black feathers over the beak ; they are sometimes few in number, but are always present unless they have been removed by violence.

In the Spangled Polish (fig. 12, p. 318) each feather in the hens is banded by a black line on a white or bay ground,

and the wattles, like the comb, are reduced to a minimum and replaced by feathers. All the Polish breeds are non-sitters. I have given figures of a male and female of two different varieties in order to call attention to the fact that the feathers of the crest differ in the two sexes, in both, however, taking the form of the tail-coverts; so that they are lanceolate in the males and rounded in the females.

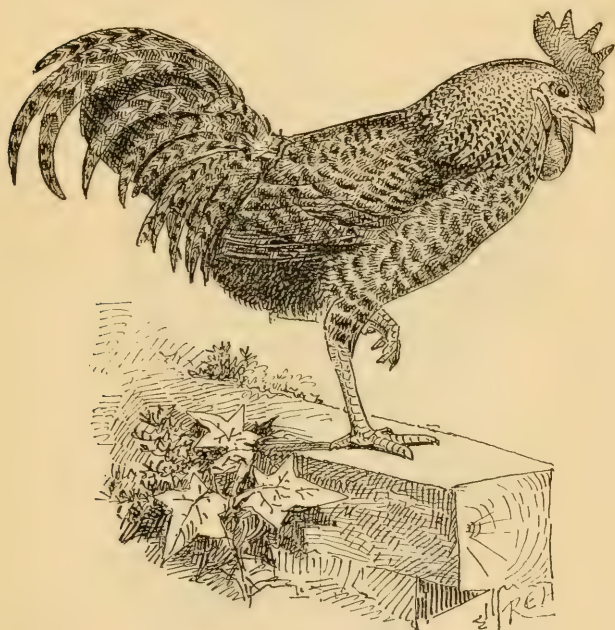
The rudimentary comb in the Polish breeds is crescentic or two-horned, and is generally developed in an inverse ratio to the feathered crest; it is even possible to establish breeds allied to the Polish retaining the deformed nasal bones, but with enlarged combs and abortive crests. Several such breeds exist in France, where crossing has been largely employed to secure good birds for the table. In the La Flèche cock (fig. 13, p. 319) the crescentic comb is fully developed in conjunction with the peculiar deficiency of the nasal bones, while the crest is extremely rudimentary and often absent. In the breeds known in France as Gueldres and Bredas, the combs and crests are both absent, and the only resemblance between these birds and the Polish breeds, from which they were apparently derived, is in the peculiar formation of the nostrils and the nasal bones; whereas in the Crève-cœurs and Houdans, breeds that have been introduced into this country since the time of Darwin's work on Variation, both the crest and comb are present.

The plastic character of these varieties may be inferred from the fact (which I have repeatedly proved) that in interbreeding half-bred Polish, in three generations the crest can either be entirely got rid of or restored to its full size by careful selection of the birds bred from.

Polish or crested fowls have been so long favourites with amateurs that numerous sub-varieties, varying as to colours &c., exist. In addition to the gold- and silver-spangled, there are purely white Polish, others entirely black, and some are Cuckoo-feathered. One of the most interesting, as illustrating a fact in variation well known to all raisers of new breeds, is the buff or Chamois Polish. In this the feathers are reddish buff, each one being tipped or spangled with

white. The breed may be regarded as Gold-spangled Polish, in which the black spangle has been changed into white—a process of easy accomplishment compared with the difficulty of obtaining a breed in which the feathers that are naturally red are changed into white. Thus, to revert to the Game breed, Black-breasted Red Game are coloured precisely like the wild *G. ferrugineus*. Nothing is more easy than to produce, by crossing with a white bird, the variety

Fig. 14.



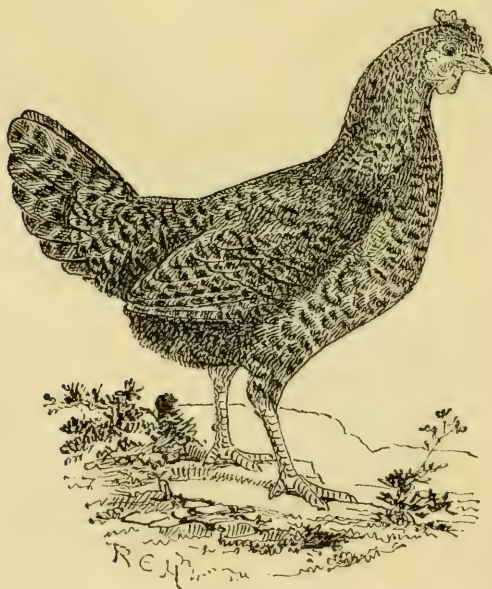
Scotch Grey Cock.

known as Pile Game, in which all the feathers that are black in the original become white, the red remaining unchanged. In the hands of a skilled breeder black and white are more easily interchangeable than any other colours, a fact which is in obvious relation to the more frequent occurrence of albinos amongst black species than those of lighter colours.

Several breeds of fowls are characterized by what is termed by fanciers "Cuckoo markings." The Plymouth Rock has already been alluded to as a cross-breed. There are also Cuckoo-coloured Dorkings, Polish, Cochins, &c. In the north of England and Scotland a Cuckoo-marked breed known as Scotch Grey (figs. 14 & 15) is frequent. In these birds the feathers are marked with transverse bands, which are not so defined as those in the hens of the pencilled Hamburgs, the bands being dark slaty grey on a lighter ground.

Sebright Bantams (figs. 16 & 17) may be regarded as the

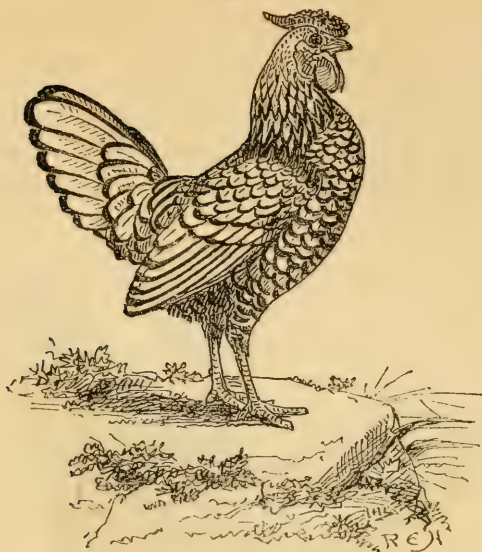
Fig. 15.



Scotch Grey Hen.

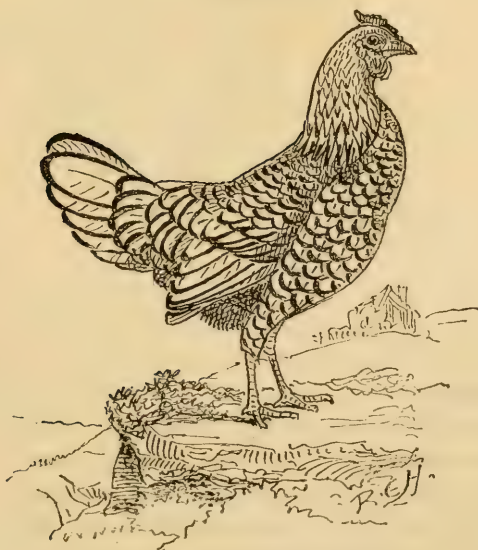
most artificial of all breeds, inasmuch as the males not only possess the plumage, but also the markings of the hens; every feather in this beautiful diminutive breed should be "laced" or margined with black, like a sheet of mourning-paper. The neck and saddle-feathers of the male should resemble those of the female, and there should be a total absence of long curved sickle-feathers in the tail.

Fig. 16.



Silver Sebright Bantam Cock.

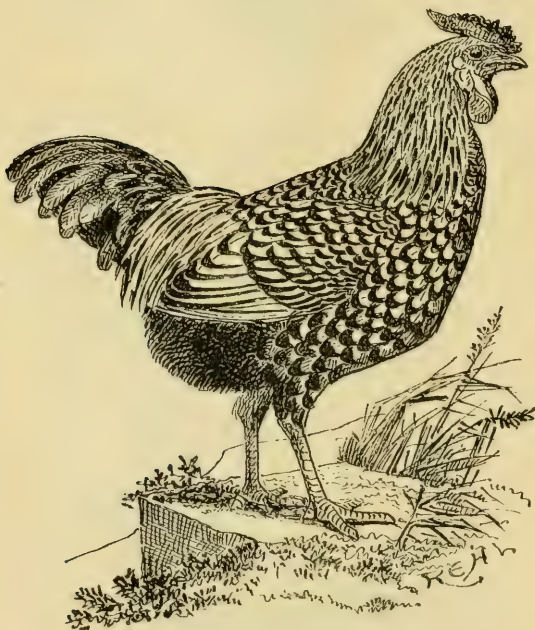
Fig. 17.



Silver Sebright Bantam Hen.

This composite breed was produced by the late Sir John Sebright by first crossing a Polish fowl with laced feathers with a Bantam. When the required size and markings had been obtained by careful selection, he crossed again with "hen-feathered cock," so as to introduce the female plumage into the males of the breed, and then by careful selection he established the breed, of which there are two varieties, one

Fig. 18.



Wyandotte Hen.

with white, or, as it is called, silver, the other with rich bay or golden ground.

In a recently manufactured American breed the laced or dark-bordered feathers of the Sebright Bantam have been obtained by careful crossing and selection, on a large bird, evidently derived from one of the Asiatic breeds, such as the Brahma: this breed is known as the Wyandotte (fig. 18). Well-laced Wyandotte hens are now common, but it will

take some few years' careful selection to obtain the required markings of the cocks in a perfect state.

Several distinct varieties exist in the smaller forms known as Bantams; the Japanese (fig. 19) is one of the most strongly characterized, the tail being of large size, the legs short, and the breast very prominent. The Japanese Bantam

Fig. 19.



Japanese Bantam.

shows that, in spite of the difficulty, colour can be localized in the fowl—the tails of many of these birds being black, the remainder of the plumage white. In breeding Pigeons nothing is easier than to localize colour, and to breed birds with black tails and white bodies, or yellow wings on a white ground &c., as may be desired; but in fowls such feats in breeding are very difficult and of rare accomplishment—facts,

the solution of which depends on what Darwin termed analogous variation. In many species of Columbine birds the colour is localized; white heads, for example, exist in nature in many species, but in the wild *Galli* and allied species no such arrangements of colours are known, hence the difficulty of producing such patterns in the varieties of the *G. ferrugineus*.

The singular effect produced by the shafts of all the body-feathers being curved from, instead of towards, the body is shown in the Frizzled fowls (fig. 20), which may be produced

Fig. 20.



White Frizzled Bantam Cockerel.

of any size or colour. The breed is not in high favour, being especially delicate, owing to the rain at once penetrating to the skin in place of running off the plumage.

The illustrations show the most important breeds exhibited at the show held in the Gardens of the Zoological Society. Some few characteristic varieties were not entered, such as the long-tailed breeds of Japan, in which the sickle-feathers

of the tail attain a length of six, seven, or even more feet. In these instances the growth must be continuous for many months to attain the unusual length.

In the so-called Silk fowl the feathers have the barbs entirely disconnected, so that the birds have a fluffy or woolly appearance; this in the ordinary white Silk fowl is conjoined with a singular development of black pigment, which is deposited in the skin, the periosteum, and the inter-muscular cellular tissue; but the silky feature may occur in other breeds, and is occasionally found in very different species, as, for example, in the Moorhen (*Gallinula chloropus*).

The plastic character of the species is evidenced by the fact that within a few years it has been the desire of poultry-fanciers to produce many of the varieties reduced to the size of Bantams. This has been most successfully accomplished with the Game, the Malay, the Cochín, and several others, specimens of which were exhibited at the show.

XXVIII.—*On the Habits of the Hoatzin* (*Opisthocomus cristatus*). By J. J. QUELCH, B.Sc. (Lond.), C.M.Z.S., Curator of the British Guiana Museum.

THE observations on which the following notes are based were made in March, May, and October 1888, July 1889, and January 1890; and as they extended over but short periods at each time, no doubt several characteristics have remained unnoted which more continuous attention would have revealed.

The Hoatzin is known in British Guiana by the various names of "Anna," "Hanna," "Canjé, or Stinking Pheasant," and "Governor Battenberg's Turkeys;" but in the districts where it is found the name of "Hanna" is the one most commonly used. These birds are plentifully distributed along the Berbice river above the town of New Amsterdam, along the Canjé creek, which opens into the Berbice immediately below the same town, and along the Abary creek, one of the higher branches of which leads into the Berbice river, and along which the birds have most likely spread, by this